NOTES AND LITERATURE

NOTES ON ICHTHYOLOGY

One of the most important publications in ichthyology, as a result of the stimulus given to zoology by our knowledge of evolution, is the "Cave Vertebrates of America," by Dr. Carl H. Eigenmann, of the University of Indiana, published by the Carnegie Institution of Washington. In this large and finely printed volume is a complete discussion of caves and of cave fauna, the greater part of this fauna being composed of blind fishes. The caves of Indiana, Kentucky, Missouri and Cuba have been especially investigated in this paper. Dr. Eigenmann shows very conclusively that those species of fishes which are the ancestors of the blind forms were of those types which avoid the light, skulking in darkness in preference. Those fishes which take their prey by sight alone are never represented among the ancestors of cave fishes. Dr. Eigenmann adopts the judgment, independently reached by Mr. Garman, that the originals of the cave species (non-aquatic, especially) of Kentucky were probably already adjusted to a life in the earth before the caves were formed. Dr. Eigenmann concludes:

1. That the cave fauna is in large part the result of this formation of the caves themselves, that environment and habitat developed *pari passu.*

2. That to this original fauna have been added and are being added species (such as *Spelerpes maculicauda*) which, because they are negatively heliotropic or positively stereotropic, are gradually becoming adapted to the deeper and deeper recesses of caves.

3. That to the fauna of the larger caves may also have been added animals which had become adjusted to cave existence in crevices, under banks or rocks, etc., that is, in small caves.

4. That accident has played little or no part in developing the cave fauna.

As to the general cause of degeneration, Dr. Eigenmann is inclined to take the Lamarckian view, involving the inheritance of results of disuse. A number of species of blind lizards are discussed, as well as certain blind fishes which are not found in caves. Among these are the parasitic hag fishes, *Polistotrema stouti,* of the coast of California, and the blind goby of Point Loma, in California, *Typhlogobius,* which lives in the darkness

on the under side of shelving rocks. There is also a blind catfish, *Ameiurus nigrilabris,* which is found in caves of Lancaster County, Pennsylvania.

The best known of the blind fishes belong to the family of Amblyopsidæ. The genus, *Chologaster,* contains one species with eyes, inhabiting the channels about the Dismal Swamp and the rice canals of the South. The other species are known only from caves and cave springs, and all the representatives of the genera, *Amblyopsis, Troglichthys* and *Typhlichthys,* are blind.

Dr. Eigenmann has also made an elaborate study of the blind fishes of Cuba, *Lucifuga subterranea* and *Stygicola dentatus.* These two fishes belong to the family of Brotulidæ, a relative of the blennies. The origin of these forms is from marine fishes living in clefts of coral rock. This coral rock, when raised above the sea, seems to have carried these forms with it. The nearest related genus, *Brosmophycis,* still lives among the corals.

The details of anatomy, as well as the details of environment, of each of these species, are very fully illustrated in this paper, which is by far the most important one yet devoted to this subject.

Dr. Eigenmann observes in conclusion that it is absolutely certain that the caves were not peopled by a catastrophe, and, further:

> That the cessation of use was gradual and the cessation of selection must also have been a gradual process. There must have been ever widening bounds within which the variation of the eye would not subject the possessor to elimination.
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> *Chologaster* is in a stage of panmixia as far as the eye is concerned. It is true the eye is still functional, but that the fish can do without its use is evident by its general habit and by the fact that it sometimes lives in caves.
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> The present conditions have apparently existed for many generations, as long as the present habits have existed, and yet the eye still maintains a higher degree of structure than reversed selection, if operative, would lead us to expect, and a lower degree than the birth mean of fishes depending on their eyes—the condition that the state of panmixia alone would lead us to expect. There is a staying quality about the eye with the degeneration, and this can only be explained by the degree of use to which the eye is subjected.
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> The results in *Chologaster* are due to panmixia and the limited degree of use to which the eye is put. *Chologaster agassizii* shows the rapid diminution of the eye with total disuse.
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> The difference in the conditions between *Chologaster* and *Amblyopsis, Typhlichthys* and *Troglichthys* is that in the former the eyes

are still in use, except when living in caves; in the latter they have not been in a position to be used for hundreds of generations. The transition between conditions of possible use and absolute disuse may have been rapid with each individual after permanently entering a cave. Panmixia, as regards the minute eye, continued. Reversed selection was inoperative, for economy can not have affected the eye for reasons already stated. Simply the loss of the force of heredity, unless this was caused by disuse or the process of germinal selection, can not have brought about the conditions, because some parts have been affected more than others.

Considering the parts most affected and the parts least affected, the degree of use is the only cause capable of explaining the conditions. Those parts most active during use are the ones reduced most, viz., the muscles, the retina, optic nerve and dioptric appliances, the lens and vitreous parts. Those organs occupying a more passive position, the scleral cartilages, have been much less affected and the bony orbit least. The lens is one of the latest organs affected, and not at all during use, possibly because during use it would continually be in use. It disappears most rapidly after the beginning of absolute disuse both ontogenetically and phylogenetically. All indications point to use and disuse as the effective agent in molding the eye. The process does not, however, give results with mathematical precision. In *Typhlichthys subterraneus* the pigmented layer is affected differently from that of *Amblyopsis*. The variable development of the eye muscles in different species would offer another objection if we did not know of the variable condition of these structures in different individuals. Chilton has objected to the application of the Lamarckian factor to explain degeneration on account of the variable effects of degeneration in various invertebrates. But such differences in the reaction are still less explicable by any of the other theories.

In the *Biological Bulletin* for January, 1905, Professor Eigenmann describes two species of blind fishes, *Typhlichthys osborni,* from Horse Cave, Kentucky, and *Typhlichthys wyandotte*, from Corydon, Indiana, near the large Wyandotte Cave.

In the Field Columbian Museum, February, 1909, Dr. Seth E. Meek describes a number of species from Tropical America. These are: *Rhamdia nasuta,* from Buenos Aires de Terraba, Costa Rica; *Astyanax regani,* from Las Cañas, Costa Rica; *Cyprinodon dearborni,* from Willemstad, Curaçao, Dutch West Indies; *Girardinus vandepolli,* from Curaçao; *Pœcilia caudata,* from Turrubares, Costa Rica; *Cichlasoma punctatum,* from Buenos Aires de Terraba, Costa Rica; and *Cichlasoma frontale,* from Turrubares, Costa Rica.

In the *Proceedings of the Zoological Society of London*, 1909,

Mr. Regan describes a collection of fishes from Christmas Island, six species being new.

In the same *Proceedings,* 1909, Mr. Regan gives an interesting account of the changes in coloration in living fishes, as observed in the New York Aquarium. The same subject has been since much more fully treated by Charles H. Townsend, director of the aquarium.

In the *Annals and Magazine of Natural History,* 1909, Mr. Regan gives the name *Orectolobus ogilbyi* to the species from Torres Straits which Ogilby and McCulloch had identified with *Orectolobus dasypogon.* Mr. Regan admits that *Eucrossorhinus,* established by him for *dasypogon,* is not distinct from *Orectolobus.*

In a publication of the Station at Boulogne-sur-mer, Dr. H. E. Sauvage gives a comparative study of the peritoneum of flounders.

In the *Bulletin de la Société Belge de Géologie,* 1908, Mr. Maurice Leriche discusses new species of fishes from the Oligocene of Belgium.

In the *Annales de la Société Géologique du Nord,* Volume 37, 1908, at Lille, Mr. Maurice Leriche discusses the fossil sharks of California, with special reference to the papers of Agassiz and Jordan. Leriche regards these American species as identical with the nearest corresponding species of Europe. It is a matter in which certainty is not often possible. Most of the living species now found on the Pacific Coast are different from the corresponding living sharks of Europe, but this is apparently not true in every case, and in most cases the teeth do not show adequate differences. It is also not possible in every case to know whether different teeth represent really different species, or whether they may be from different parts of the mouth of the same animal. *Heptranchias andersoni,* from California, is identified with *Notidanus primigenius,* of Agassiz. It may be here noted that *Heptranchias* of Rafinesque is much the older of the two generic names concerned. *Lamna clavata,* of Agassiz, is identified with the European *Lamna cuspidata,* of Agassiz. Mr. Leriche states that in another paper he will show that this species belongs to *Odontaspis,* and not to *Lamna.* Mr. Leriche regards *Isurus planus, I. tumulus* of Agassiz, and *I. smithii* of Jordan, as identical. *Planus,* according to Leriche, represents the upper teeth, and *tumulus* the lower teeth, while *smithii* is the name of the front teeth of young specimens. It is not un-

likely that this view of the case is the correct one. We may notice, however, that Rafinesque's name *Isurus* is much older than *Oxyrhina*. *Carcharodon rectus,* of Agassiz, and *C. branneri,* of Jordan, are regarded as identical with *C. megalodon,* the giant shark of the Miocene fossil beds about the Atlantic. *C. arnoldi,* of Jordan, and *C. riversi,* of Jordan, Leriche regards as identical with the living *C. rondeleti,* for which the older name is *C. carcharias.* This may possibly be true of the *riversi,* but the *arnoldi* is based on a specimen far larger than that of the largest living man-eating shark, *C. carcharias. Hemipristis heteropleurus,* of Agassiz, is regarded as identical with the European *Hemipristis serra.* This identity was also indicated by Dr. Jordan. *Galeocerdo productus,* Agassiz, is regarded as identical with *G. aduncus,* Agassiz. Among the unidentified teeth photographed in Jordan's paper, Leriche recognizes *Aprionodon, Galeus* and *Squatina.*

Leriche also notes that these observations show the great geographical extension of the species of sharks, and the importance that these have in the establishment of synchronisms at great distances. It is, however, true that specific differences of many kinds exist in species of shark, without showing themselves in the teeth. It is, however, safe to recognize no species as now known by the teeth alone, unless the teeth show tangible differences.

In the same annals Leriche describes numerous sharks and other fishes from the early Tertiary about Rheims.

In the same annals Leriche describes the teeth of various carboniferous fishes of the north of France and of Belgium.

In *Science,* May 28, 1909, Mr. Barton A. Bean shows that the name of the American eel should be *Anguilla rostrata* (Le Sueur), this name being earlier than that of *chrisypa* given by Rafinesque at about the same time.

In the *Bulletin of the American Museum of Natural History,* Volume 26, 1909, Dr. L. Hussakof describes a new species of the extraordinary genus of goblin sharks, of which the living form is known as *Mitsukurina,* and the extinct species by the earlier name of *Scapanorhynchus.* Dr. Hussakof gives to this new species the name of *Scapanorhynchus jordani.* In this species, the long blade of the snout is longer than in *S. owstoni;* the eye is further forward, the gills are smaller, and there are other differences of importance. Dr. Hussakof has no doubt that *Mitsukurina* is identical with the Cretaceous *Scapano-*

rhynchus, as indicated by Dr. Woodward. The differences between these living and fossil species are no greater than the differences among the species of the genus itself. Dr. Hussakof agrees with Jordan that *Scapanorhynchus* is closely related to the Odontaspid sharks, but whether it should be placed in that family or constitute a distinct family must depend on further studies of its anatomy.

One of the most remarkable features in geographical distribution is the extraordinary number of singular animals, especially sharks and chimæras, which have been discovered in the waters of Sagami Bay, the first bay to the southward of Tokyo in Japan.

In the Mark Anniversary Volume Dr. Jacob Reighard describes in great detail the natural history of the bowfin, *Amia calva,* with colored plates of different stages in the development of this singular fish.

In the *Proceedings of the Biological Society of Washington,* 1909, Dr. Barton Warren Evermann and Edmund Lee Goldsborough describe a number of fishes from the canal zone of Panama. Of these, *Cheirodon gorgonæ,* from Gorgona, is new.

In the same *Proceedings,* 1909, Dr. Barton Warren Evermann and John Treadwell Nicholas describe the fishes of Crab Creek, in the state of Washington, and with a new species or variation of trout known as *Salmo eremogenes.* This is a very robust form, with the spots gathered on the posterior part of the body. It is apparently a variant of the cut-throat trout, *Salmo clarki.*

In the same *Proceedings,* 1909, Dr. Evermann and Lewis Radcliffe have an interesting note on *Orestias agassizii,* a singular fish from Lake Titicaca.

In the *Memoirs of the Carnegie Museum,* Volume 4, 1909, Dr. Jordan and Robert Earl Richardson have a catalogue of the fishes of the island of Formosa, or Taiwan, based on the collections of Dr. Hans Sauter. The fauna of this island is essentially tropical, and intermediate between that of Japan and that of India. Most of the two hundred and eighty-six species known are from sandy shores and bays, scarcely any collections having been made among the coral reefs. In this paper nine new species are described and elegantly figured.

In the *Annals of the Carnegie Museum,* Volume 6, 1909, are three reports of the expedition to British Guiana of the Indiana University and the Carnegie Museum. This is part of the work undertaken by Dr. Carl H. Eigenmann under the joint patronage of the two institutions mentioned, and having in view as its

final purpose a complete investigation of the geographical distribution of fresh water fishes in South America, and the relation of the barriers separating river basins to the development of new species. The first of these reports by Dr. Eigenmann gives new genera and species of fishes in British Guiana. A remarkable feature of this investigation is the discovery that almost all types of fishes found in different species in North America are represented in South America by analogies belonging to the family of Characidæ. Thus, minnows, chubs, suckers, darters and perches all have their representatives in a family which is not represented by any of these, but which practically monopolizes the waters of South America.

The second of these reports, by Marion Lee Durbin, describes one new genus and twelve new species of characins.

In the third report, Mr. Christian B. Blosser describes fishes obtained, most of them incidentally, in the West Indies and on the coast of Guiana. The following are new species: *Apogonichthys melampodus,* from St. Croix; *Bodianus stellatus,* from St. Croix; *Holocanthus lunatus,* of St. Croix; *Spheroides asterias,* St. Croix. *Chromis marginatus,* a species not previously found so far north, was also found at St. Croix.

In the *Proceedings of the Royal Society of New South Wales,* 1908, Ogilby and McCulloch offer a revision of the Australian Oretolobidæ, group of carpet-sharks, some of them known locally as wobbegongs.

In the *Records of the Australian Museum,* Allan R. McCulloch publishes studies in Australian fishes, No. 2, with descriptions of a number of new or rare species from about Sydney.

In the *Ann. Mus. Zool.* of St. Petersburg, Volume 14, 1909, Dr. Leo S. Berg demonstrates the distinctness of the genus *Acanthogobio* from *Hemibarbus.*

In the same publication, Dr. Berg discusses the trout of the Sea of Aral, *Salmo trutta aralensis.*

In the same bulletin, Dr. Berg discusses the salmon of the Black Sea, *Salmo salar labrax.*

In the same bulletin Dr. Berg gives a list of the fishes of the River Ob, or Obi, forty-two in number.

In a publication of the Provincial Museum of Natural History and Ethnology, at Victoria, British Columbia, 1909, Mr. Francis Kermode, curator, gives a list of the animals represented in the collection, with excellent photographs of many of the species of fish, as well as of birds, totem poles and other objects of

interest. This collection has the only two known specimens of the prow fish, *Zaprora silenus.*

In the *Proceedings of the Biological Society of Washington,* Volume 22, 1909, Mr. T. D. A. Cockerell, of the University of Colorado, with Mr. Otis Callaway, has a very interesting discussion of the scales of fishes, as showing their genetic relationship. In this paper the herbivorous cyprinoid fishes are treated, and it is shown that the subfamily Chondrostominæ, as recognized in America, is even more heterogeneous than was hitherto supposed. *Chrosomus* stands entirely apart from the others, its scales having the primitive sculpture of the scales of the suckers. The herbivorous forms in America are divided by Mr. Cockerell into four subfamilies: Chrosominæ, including *Chrosomus;* Chondrostominæ, including *Acrocheilus* and *Orthodon;* Campostominæ, including *Campostoma;* and Pimephalinæ, including *Pimephales* and *Hybognathus.* These last are most nearly related to the ordinary minnows.

In the same *Proceedings,* 1909, Mr. Cockerell, and Miss Edith M. Allison, continue the investigations of the scales of fishes, with photographs of several of the different types. Taking up the genus called *Leuciscus,* he suggests that probably none of this species are congeneric with the European *Leuciscus leuciscus.* If this view is correct, which seems probable, the name *Richardsonius* should probably be adopted for the American forms referred to this group. *Lavinia* is not one of the Chondrostominæ, but it is closely related to the forms called *Richardsonius.* Probably none of the American species referred to the genus *Rutilus* of Rafinesque are congeneric with the *Rutilus rutilus* which is an ally of *Leuciscus.* Mr. Cockerell separates *Nocomis,* of which the type is *kentuckiensis,* from the genus *Hybopsis,* basing the genus on the character of the scales. These are supported by numerous minor characters. *Hybopsis gelidus* is made by Cockerell the type of a new subgenus, *Macrhybopsis.* Cockerell regards *Hybopsis, Notropsis* and *Cliola* as derived from Pimephalinæ.

These investigations of the character of the scales seem likely to prove very important as indicating the real relationships of these variant forms.

In the *Bulletin of the Museum of Comparative Zoology,* 1909, Mr. Henry B. Bigelow describes the cruise of the United States Fisheries Schooner "Grampus" in the Gulf Stream during July, 1908.

In the *Proceedings of the United States National Museum,* Volume 37, 1909, Professor Oliver P. Hay, discusses the nature of the fossil sharks, with tooth-like structures, known as *Edestus,* with a description of a new species and a new genus, *Toxoprion.* Dr. Hay regards these, not as teeth, but as a succession of spines or spinal structures in front of the dorsal fin, and used as weapons of offense.

In the *Proceedings of the National Museum,* Volume 36, 1909, Professor John O. Snyder describes new genera and species of fishes obtained on the voyage of the "Albatross," in 1906, on the Coast of Japan and the Riu Kiu Islands.

In the Smithsonian Miscellaneous Collections, Volume 52, 1909, Barton A. Bean and Alfred C. Weed discusses the life history of the Alaskan fresh-water sculpin, *Cottus asper.* These little fishes are extremely greedy and destroy great numbers of salmon eggs.

The British Museum has published the first volume of an elaborate catalogue of the fresh-water fishes of Africa, by Dr. George Albert Boulenger. The first volume contains the Mormyridæ, the Characinidæ, and part of the Cyprinidæ, with a number of minor families. The book is well printed, and each of the species is represented by a good plate.

In *Zoologica,* for 1909, Mr. Edward Phelps Allis, Jr., publishes a most elaborate account of the anatomy of certain mail-cheeked fishes, fifteen species being represented in his studies, and the bony structure of each of these described with a degree of fullness not hitherto shown in any papers on the osteology of fishes. This piece of work is accompanied by admirable engravings. The only suggestion which could arise by way of criticism is that not nearly all the types of the mail-cheeked fishes are represented, and that a full comparative study in which all of them would be considered might lead to results which can not flow from merely descriptive work on a part of a large and varied group.

In the Publications of the Department of Fisheries of New South Wales, for 1908, David G. Stead discusses the beaked salmon, *Gonorhynchus,* and its distribution in Australia.

In the same publications, Mr. Stead describes a number of new species of fish from the coasts of New South Wales.

In the *Annals of Queensland Museum,* Number 9, for 1908, Mr. J. Douglas Ogilby describes a number of new species and genera from the coast of Queensland.

In a second paper Mr. Ogilby discusses the toad-fishes of Queensland. A new genus, *Batrachomœus,* is proposed for *Batrachomœus minor,* and a new genus, *Coryzichthys,* for *Batrachoides diemensis.* This differs from the American genus, *Marcgravia,* in a much smaller number of fin rays. A new generic name, *Halobatrachus,* is proposed for *didactylus* of the Mediterranean. This differs from *Batrachoides* in the presence of an axillary pore.

In the index to the meeting of the British Association for the Advancement of Science, at Winnipeg, 1909, Professor W. A. Herdman gives an interesting discourse on "Our Food from the Waters," the investigation of plankton being made especially prominent.

In the *Memoirs of the American Museum of Natural History,* Volume 9, 1909, Professor Bashford Dean presents studies on fossil fishes (sharks, chimæroids and arthrodires). This contains, among other things, an elaborate study of the genus *Cladoselache,* a Devonian shark, and one of the simplest, as well as the earliest, representatives of that group. Elaborate drawings are given of the structural characters of *Cladoselache,* and the final conclusion is that these represent better than any other the primitive shark. Dr. Dean agrees with Woodward that if the earliest true fish could be found, it would almost certainly fall within the subclass to which belong our modern sharks; and the fundamental characters of the cladoselachian have given us a less ghostly picture of a direct vertebrate ancestor.

As to the arthrodires, Dr. Dean thinks that the present evidence does not lead us to affirm that these fishes possessed paired appendages homologous with pectoral and pelvic fins. There is still, therefore, a great gap remaining between these forms and the true fishes.

In the *Bulletin of the United States Geological Survey,* Mr. Earle Bernard Phelps discusses the subject of the pollution of streams by sulphite pulp waste. The exclusion of these forms of waste from the streams is one exceedingly important in the protection of the fishes of our rivers. Thus far, it has not been possible to prevent the flow of these mischievous substances into the streams, and their value for utilization in other ways is very slight. According to Mr. Phelps, the best promise seems to be along the line of the formation from sulphite of the dye called "lignone." These substances dye wool directly, giving

brilliant yellow, brown and green colors that are fast to soap, acids and alkalies, and reasonably fast to sunlight.

In the Report of the Commissioner of Fisheries of British Columbia, 1908, Mr. John Pease Babcock, Commissioner, discusses the salmon problems of Puget Sound, and the Treaty of April 11, 1908, under which the International Fisheries Commission has been organized.

In the *Comptes Rendus* of the Academy of Sciences of Paris, M. A. Cligny describes a new genus of Zeinæ, called *Parazenopsis,* from Morocco. The species is *Parazenopsis argenteus.*

In the *Annales de la Station Aquicole de Boulogne-sur-Mer,* M. Cligny shows that the species called *Harengula latulus* is nothing but a common sprat, *Clupea sprattus.* The species called *Meletta phalerica* and *M. mediterranea* are also identical with the common sprat, the Mediterranean representatives of which form a geographical race, distinguished from the races in the north of Europe, having one less vertebra, and a few less of the anterior rays.

In the same *Annales,* M. Cligny discusses the genus of *Scorpœnidæ* called *Helicolenus.* He shows that three distinct species have been confounded under the name of *maderensis.* Of these, the first, that of Cuvier, should disappear, being a simple variety of *Scorpœna scrofa;* the second, that of Lowe, should receive a new name; the third, that of Goode and Bean, should disappear, being a synonym of *Helicolenus dactylopterus.*

M. Cligny, however, conscientiously refrains from giving this new species a distinctive name, because he has never had any specimen in hand.

> Nous ne nous permettons pas de donner un nom nouveau à une espèce que nous n'avons jamais eue sous les yeux; nous laissons ce soin à un naturaliste plus favorisé et qui pourrait donner en même temps un diagnose précise de l'espèce.

In the same *Annales,* M. Cligny discusses in greater detail the new genus *Parazenopsis.*

In Notes from the Leyden Museum, Volume XXXI., 1909, Professor Max Weber, of Amsterdam, describes new fishes obtained by the Siboga Expedition to New Guinea and neighboring waters. A number of new species are added to the endlessly rich fauna of the Island of the Tropical Pacific. *Rhabdamia* and *Siphamia* are new genera related to *Apogon.*

In another paper, in connection with the aquarium at Amster-

dam, Dr. Weber adds a new *Fierasfer* to the list of Siboga fishes.

In the AMERICAN NATURALIST, Vol. 42, 1908, Professor Cockerell describes the results of the expedition to Florissant in 1908. In this wonderful deposit of fossils, specimens of *Trichophanes foliarum,* of Cope, were found. This little fish, of which figures are given by Professor Cockerell, appears to belong to the suborder Xenarchi, and to be a near relative of *Aphredoderus,* a living pirate perch. It shows also relationships with the trout perch, *Percopsis,* like *Aphredoderus,* a relic of a waning fauna.

In the *Records of the Canterbury Museum,* Volume 1, 1909, Mr. Edgar R. Waite gives an account of the scientific results of the New Zealand Government Trawling Expedition of 1907. A number of new species are described, one of the most interesting being the blind torpedo, *Typhlonarke aysoni.* Only the sharks and rays are discussed in this first paper.

Under the head of "Salmon Scales as Indicative of the Life History of the Fish," Mr. J. Arthur Hutton publishes, in the form of a paper read before the Manchester Anglers Association, an article in which he shows that the scales of salmon are obtained through life, and that in a general way the age of the fish can be shown by the scales. During its stay in fresh water, the scales rapidly disintegrate, and are restored again when the fish returns to the sea. In his judgment the European salmon does not live over eight or nine years. Mr. Hutton illustrates his thesis by numerous photographs of salmon scales.

In the *Memoirs of the Indian Museum,* Volume 2, Dr. N. Annandale, the superintendent of the museum, commences a report of the fishes taken by the Bengal Fisheries Steamer "Golden Crown." The first paper treats solely of the rays, of which numerous species were obtained. One partially blind torpedo is given the name *Bengalichthys.*

In the *American Journal of Obstetrics,* Dr. Charles R. Stockard discusses the formation of cyclopean monsters among fishes by bringing up the little fishes in solutions of sea water containing chloride or nitrate of magnesium.

The same subject is discussed by Dr. Stockard in the *Anatomical Record,* Volume 3, 1909.

In the *American Journal of Anatomy,* Volume 9, 1909, Dr. Harold D. Senior discusses the development of the heart in the shad, with descriptions and bibliographies.

In the *Anatomical Record,* Volume 1, 1907, Dr. Senior dis-

cusses a number of rows of valves in the arterial bulb in the heart in different fishes. In most bony fishes the arterial bulb contains a single tier of valves. In *Albula,* there are two tiers; in *Elops* one tier; in *Pterothrissus* two tiers.

In the *Philippine Journal of Sciences,* Volume 4, 1909, Mr. Alvin Seale discusses very fully the fishery resources of the Philippine Islands, with colored plates of a number of the more valuable species.

In the same *Journal,* Mr. Seale discusses the sponge fisheries of the Philippine Islands, with numerous plates.

In the *Biological Bulletin,* Mr. H. H. Newman, of the University of Texas, discusses hermaphroditism in fishes, a bisexual specimen of *Fundulus* being considered, this being a species in which the females are very differently marked from the males.

In the same *Bulletin,* Mr. Newman discusses the contact organs, fine papillæ found on the scales and fins in certain fishes. These have been studied by him in species of *Fundulus* at Woods Hole. These contact organs are supposed to give the fish greater sensitiveness, and also, perhaps, to increase the frictional surface of the animal.

In the *Journal of the College of Science in the Imperial University of Tokyo,* 1908, Mr. Shigeho Tanaka describes six species new to science from the East Coast of Japan.

In the same *Journal,* 1909, Mr. Tanaka describes eleven new species of Japanese fishes, one of them being a new genus of Chimæras called *Anteliochimæra.* This form has a snout produced in a long spatula, as in *Rhinochimæra.* It adds one more to the dozen or so extraordinary forms of sharks, skates and chimæras which have been obtained within the last ten years in the Bay of Sagami.

This specimen was caught, probably, with a hook, in a depth of four hundred fathoms, by the remarkable collector employed at the Seaside Laboratory at Misaki, Kuma Aoki. This unlettered fisherman, who can not read even his own language, is in his way one of the cleverest ichthyologists in Japan.

In the *Annotationes Zoologicæ Japonenses,* Volume 7, 1909, Mr. Tanaka discusses a collection of fishes from the interior province of Shinano.

In the *Proceedings of the United States National Museum,* 1909, Jordan and Richardson give a review of the sea bass, or Serranidæ, inhabiting the waters of Japan, with numerous figures, and the description of one new species. When this series

of monographic reviews of Japanese fishes was begun, in 1900, as a result of the exploration made in that year by Jordan and Snyder, it was hoped that they would serve to furnish to Japanese naturalists a record of the literature largely inaccessible to them, and a record of descriptions of the known species. It was hoped at the same time that making the literature of the subject compact in this way would lead to a rapid development of the science of ichthyology among the Japanese naturalists themselves. The recent publications of Ishikawa, Kishinouye Otaki, and Tanaka, and of other students of the great teacher, Mitsukuri, have shown that these expectations have not been disappointed.

In the *Revista Universitaria,* Peru, 1909, Professor Carlos E. Porter, of Valparaiso, gives a list of the most important fishes on the coast of Chili and Peru. Forty-six species are enumerated.

In the Publications of the Bureau of Science of the Philippine Islands, at Manila, Jordan and Richardson give a check list of the fishes known to inhabit the waters of the Philippine Islands. This list, based on the various collections made under the auspices of the United States Government, and of the local Bureau of Science, now numbers eight hundred thirty species.

It is probable that a full enumeration of the fishes of these islands will rise to double that number. One new genus is proposed in this paper, *Vespiculus* for *Prosopodasys gogorza.*

DAVID STARR JORDAN.

ENTOMOLOGY

A New Catalogue of Hemipterous Insects.[1]—A catalogue exhibits the taxonomy of a group in its most condensed form. For this reason, it is as interesting and valuable to a specialist as it is uninteresting and unintelligible to one who has paid no attention to the particular order or family it represents. It has indeed a very high value for the uninitiated, inasmuch as it gives him a clue to the literature on and affinities of any particular form he may need to investigate; but it is only the specialist, who has long worked on the group, who can at once appreciate its dramatic significance. The present reviewer ventures to consider himself an hemipterist of a sort, but his particular speciality has been the tail of the order, as it were, while the first volume of the new

[1] "Catalogue of the Hemiptera (Heteroptera)," by G. W. Kirkaldy, Vol. I, Cimicidæ. Berlin, F. L. Dames, 1909.